

## Assignment 5

Textbook assignment: Chapter 8, "Combinations and Permutations," pages 8-1 through 8-27 and Chapter 9, "Probability," pages 9-1 through 9-29.

*Learning Objective:*

*Apply the concepts of combinations, principle of choice, and permutations to problem solving.*

- 5-1. Permutations and combinations are different in that permutations are ordered and combinations are not ordered.
1. True
  2. False
- 5-2. The symbol  ${}_7C_3$  means combinations of
1. three groups with seven items each
  2. three items grouped in seven different ways
  3. seven groups arranged in three different ways
  4. a group of seven items taken three at a time
- 5-3. Find the value of  $7!$ .
1. 7
  2. 28
  3. 720
  4. 5,040
- 5-4. Subtracting  $2!$  from  $4!$  gives
1.  $2!$
  2.  $2!(2! - 1!)$
  3. 11
  4. 22
- 5-5.  $\frac{(n+4)!}{(n+2)!}$  is equivalent to
1.  $(n+3)(n+4)$
  2.  $(n+3)!(n+4)$
  3.  $(n+4)(n+3)(n+1)!$
  4.  $(n+1)!(n+2)(n+3)(n+4)$
- 5-6. The value of  ${}_5C_0$  is
1. 1
  2. 5
  3. 0
  4. undefined
- 5-7. The formula  ${}_nC_r = \frac{n!}{r!(n-r)!}$  is equivalent to which of the following results when  $n = r$ ?
1. 1
  2. 0
  3.  $\infty$
  4. An undefined quantity
- 5-8.  ${}_8C_5$  equals
1. 56
  2. 336
  3. 40
  4. 6,720
- 5-9. In how many ways can a committee of four people be chosen out of seven people?
1. 28
  2. 35
  3. 840
  4. 5,040
- 5-10. If a division consists of eight ships, how many combinations of two ships each can be made up from the division?
1. 16
  2. 28
  3. 1,230
  4. 1,680
- 5-11. If 10 children are on a baseball team's roster, how many different teams of 9 players may be formed?
1. 10
  2. 11
  3. 19
  4. 90
- 5-12. Find the value of  ${}_5C_3 \cdot {}_3C_2$ .
1. 10
  2. 13
  3. 21
  4. 30

- 5-13. A person buying a pizza has a choice of one size from three and two toppings from six. How many different pizzas are possible?
1. 18
  2. 45
  3. 3
  4. 15
- 5-14. S division has 5 workers, A division has 7 workers, and K division has 8 workers. How many possible working parties composed of 2 workers from S division, 3 workers from A division, and 3 workers from K division can be selected?
1. 101
  2. 15,423
  3. 17,647
  4. 19,600
- 5-15. The number of permutations of four items taken together is equal to
1. 9
  2. 10
  3. 20
  4. 24
- 5-16. The number of permutations of three items taken together exceeds the number of combinations of these three items taken together by
1. 0
  2. 5
  3. 6
  4. 4
- 5-17.  $5P_3$  equals
1. 48
  2. 60
  3. 64
  4. 72
- 5-18. How many five-digit student identification numbers can you form using the digits 1 through 8 if each digit can be used only once?
1. 40
  2. 56
  3. 6,720
  4. 32,768
- 5-19. A jeweler is presented with 10 rings and asked to select the 4 she likes best and to rank them from first to fourth. What is the number of possible outcomes?
1. 40
  2. 210
  3. 5,040
  4. 151,200
- 5-20. Find the value of  ${}_9P_4 \cdot {}_6P_0$ .
1. 9!
  2. 126
  3. 216
  4. 3,024
- 5-21. The letters of the word THE can be arranged in several ways. If two of these arrangements are THE and HTE, the remaining arrangements are
1. HET, ETH, EHT, TEH
  2. HET, ETH, EHT
  3. HET, ETH, TEH
  4. TEH, ETH, EHT
- 5-22. How many arrangements can you make using the letters in the word AIRCRAFT?
1. 1,680
  2. 9,760
  3. 10,080
  4. 20,160
- 5-23. Using the digits 1 through 7, how many more three-digit numbers can you form with repetition than without repetition?
1. 64
  2. 118
  3. 133
  4. 154
- 5-24. Using the digits 1 through 8, how many even four-digit numbers can you form without repetition?
1. 24
  2. 840
  3. 1,250
  4. 1,680
- 5-25. How many possible outcomes are there in answering at random four true-false questions?
1. 16
  2. 8
  3. 32
  4. 4

*Learning Objective:*

*Apply the basic concepts of probability to problem solving.*

- 5-26. If a trial must result in any of  $n$  equally likely outcomes, and if  $s$  is the number of successful outcomes and  $u$  is the number of unsuccessful outcomes, then the probability of succeeding is represented by which of the following equations?
1.  $\frac{s}{u + n}$
  2.  $\frac{s}{s + u}$
  3.  $\frac{s}{n}$
  4. Both 2 and 3 above
- 5-27. A bookshelf contains four chemistry books, three physics books, and five mathematics books. What is the probability of selecting a mathematics book?
1. 1
  2.  $\frac{5}{12}$
  3.  $\frac{7}{12}$
  4.  $\frac{1}{5}$
- 5-28. If a pair of fair dice are tossed, what is the probability of getting a sum of 12?
1.  $\frac{1}{2}$
  2.  $\frac{1}{3}$
  3.  $\frac{1}{18}$
  4.  $\frac{1}{36}$
- 5-29. The probability of an event always lies in the range from 0 and 1, inclusively.
1. True
  2. False
- 5-30. If the probability of success is equal to  $\frac{s}{s + f}$ , then the expression  $1 - \frac{s}{s + f}$  represents
1. a problematic outcome
  2. the probability of success
  3. the probability of failure
  4. the number of possible outcomes
- 5-31. A box contains 3 red balls and 2 green balls. If drawing a red ball is considered successful, what is the probability of failing?
1. 0.2
  2. 0.3
  3. 0.4
  4. 0.6
- 5-32. A shipment of 500 light bulbs contains 95 defective bulbs. If you purchase 1 of these 500 bulbs, what is the probability that the bulb will work?
1. 0.81
  2. 0.19
  3. 0.99
  4. 0.01
- 5-33. If a man draws cards at random from a complete deck (52 cards) and replaces each card prior to the next draw, how many spades can he expect to draw out of 80 attempts?
1. 13
  2. 20
  3. 39
  4. 40
- 5-34. A contractor bids on a job to construct a building. There's a 0.7 probability of making a \$175,000 profit. What is the contractor's mathematical expectation?
1. \$52,500
  2. \$250,000
  3. \$175,000
  4. \$122,500
- 5-35. If the outcome of one event has no influence on the outcome of another event, the events are said to be
1. separate
  2. independent
  3. unattached
  4. disjointed

- 5-36. When dealing with independent events, you calculate the probability that one and then the other event will occur by combining their separate probabilities through
1. subtraction
  2. division
  3. addition
  4. multiplication
- 5-37. If a coin is flipped three times, what is the probability of heads showing up all three times?
1.  $1/8$
  2.  $1/6$
  3.  $1/3$
  4.  $1/2$
- 5-38. What is the probability of answering four true-false questions correctly?
1.  $1/18$
  2.  $1/16$
  3.  $3/16$
  4.  $1/2$
- 5-39. If the outcome of one event influences the outcome of another event, the events are said to be
1. equivalent
  2. additive
  3. dependent
  4. exclusive
- 5-40. Assuming no replacement after each drawing, what is the probability that you will draw first a nickel and then a dime out of a jar containing three dimes, four nickels, and five pennies?
1.  $1/5$
  2.  $1/6$
  3.  $1/11$
  4.  $1/12$
- 5-41. A shipment of 40 items contains 6 defectives. What is the probability of randomly selecting 3 defective items in a row?
1.  $9/20$
  2.  $3/20$
  3.  $27/8,000$
  4.  $1/494$
- 5-42. A workshop is attended by 10 men and 12 women. If the instructor randomly selects 4 attendees for a special project, what is the probability that they are all women?
1.  $1/3$
  2.  $9/133$
  3.  $2/11$
  4.  $1,296/14,641$
- 5-43. Mutually exclusive events differ from dependent events in that with the former the occurrence of one event
1. precludes the other event from occurring
  2. makes it possible for the other event to occur
  3. increases the probability of the other event occurring
  4. reduces but does not eliminate the probability of the other event occurring
- 5-44. What is the probability of drawing a red ace or a red king from a standard deck of 52 playing cards?
1.  $1/26$
  2.  $1/13$
  3.  $2/13$
  4.  $4/13$
- 5-45. If each of eight horses in a race has an equally likely chance of winning, what is the probability of choosing a horse that finishes first or second?
1.  $1/2$
  2.  $1/8$
  3.  $3/8$
  4.  $1/4$
- 5-46. A class consists of 7 physics majors, 10 chemistry majors, 5 biology majors, and 14 mathematics majors. What is the probability that you will select one student who is either a mathematics or a chemistry major?
1.  $1/24$
  2.  $35/324$
  3.  $2/3$
  4.  $1/9$

5-47. Which of the following is NOT a characteristic of empirical probability?

1. All possible outcomes can always be listed
2. It is used in industrial quality control
3. Probabilities are estimated from experience and observation
4. Probabilities are obtained from situations that are not equally likely to occur

5-48. An adequate statistical sample is one that is large enough that accidental runs of luck offset each other.

1. True
2. False

5-49. If a batter hits 5 home runs in 200 times at bat, what is the statistical probability that he will hit a home run the next time at bat?

1. 0.4
2. 0.04
3. 0.05
4. 0.025

5-50. A grocery store is planning to sell unmarked boxes of candy, cookies, and chips. The unmarked assortment contains 200 boxes of candy, 250 boxes of cookies, and 300 boxes of chips. If one box is selected, what is the probability that it is a box of cookies?

1. 1
2.  $\frac{1}{3}$
3.  $\frac{1}{250}$
4.  $\frac{1}{2}$